

REMARKS

General

Inventor Richard Scheps is referred to herein as "Applicant".

U.S. Patent 5,822,047 issued on October 13, 1998 to Contarino, et al is referred to herein as "Contarino".

U.S. Patent 5,082,362 issued on January 21, 1992 to Schneiter is referred to herein as "Schneiter".

U.S. Patent 5,117,126 issued on May 26, 1992 to Geiger is referred to herein as "Geiger".

U.S. Patent 5,506,616 issued on April 9, 1996 to Scheps is referred to herein as "Scheps '616."

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Status of Claims

Claims 1-7 are pending in the application.

Claim 1-3, 5 and 7 are rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Scheps '616.

Claim 4 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Scheps '616 in further view of Schneiter.

Claim 6 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Scheps '616 in further view of Geiger.

Summary

Claims 1-7 remain in the application. Applicant respectfully requests reexamination and reconsideration of all claims. The necessary 37 C.F.R. §1.17(e) fee for continued examination under 37 C.F.R. §1.114 is attached hereto.

Response to Rejection of Claims 1-3, 5 and 7 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

"After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the

applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claims 1-3, 5, and 7 are rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Scheps ‘616.. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action in that there is no citation of any suggestion in the art for combining the teachings of Contarino and Scheps ‘616. Examiner offers no reference nor authority that proposes combining the Contarino and Scheps ‘616 teachings in any manner for any purpose.

Moreover, even when combined, these teachings do not include every element of Applicant’s invention as claimed, and do not appear to lead to **any** advantageous result, which is consistent with a lack of suggestion or motivation for such combination. Contarino describes a classical lidar system that illuminates the target with a single pulse, which is brief enough to permit simple discrimination of ocean surface and submerged target [col. 4 at lines 6-19] but Contarino neither considers nor suggests the concurrent **temporal and spatial discrimination** of lines and pixels as taught and claimed by Applicant in the present application. The “spatial discriminator” aspect of the “line scan” element of Applicant’s invention is described at page 6 at lines 11-13 of the specification and is neither taught nor suggested by Contarino. Scheps ‘616 teaches an apparatus for generating a “spatially-resolved image” and neither considered nor suggests the concurrent **temporal and spatial discrimination** of lines and pixels as taught and claimed by Applicant in the present application. Contarino merely detects an object by sensing a reflection or “echo” of the single laser pulse launched into an underwater environment. As claimed, Applicant teaches a “line-scan” technique for accumulating a matrix of pixels making up a complete visual image of the underwater target (Applicant claims an “imaging” lidar). This invention uses the “line scan” technique to scan the area containing the target and to generate a “scanned” image of the target. Neither Contarino nor Scheps ‘616 mention target scanning; Contarino is concerned only with displaying the temporal waveform of the single-pulse light echo signal on an oscilloscope-type display, in which he can distinguish surface and target echos for a single pulse. Scheps ‘616 specifically teaches “a ‘flooding’ search beam 15a of illumination to cover an area in much the same way as a floodlight covers an area.” [col3, lines 35-38] and merely subtracts the echos from two different “floods” to derive a “spatially-

resolved image" that relies on neither temporal-discrimination nor target line scanning in any manner whatsoever.

Contarino neither teaches nor suggests the **range-gating** element of the invention as taught and claimed by Applicant in the present application. This is not to be confused with mere "gating," which is a generic term of wide application. As described in the specification at page 6, "range gating" is distinct from and should not be confused with the "ranging" concept used by Contarino. **Range gating** denotes a **temporal-discrimination** process wherein a detector is shuttered or blocked so that no light is received except for a very short gating time (nanoseconds) when the shutter is open. The shutter opening is delayed with respect to the launching of each of many laser pulses and the brief light echo signal received during the "gating" period corresponds to a single "pixel" within a temporal "slice" of the target. Conversely, as clearly taught by Contarino and Scheps '616 (as prior art), **ranging** denotes a process where a clock, which was started upon the launch of a laser pulse toward a target, is halted upon detection of light back-scattered from the target so that the round-trip transit time can be used to determine the distance to the target. The detector for a ranging application is never blocked, which allows backscattered light to enter the detector for the entire duration of the laser pulse transit, increasing noise and preventing any "temporal discrimination" of imaging data. Although Contarino is unconcerned with imaging, these disadvantages of the "ranging" technique oblige him to add a radar modulation of his single laser pulse to permit stochastic analysis (needed to compensate for the lack of available temporal discrimination) of the ranging echo to improve target detection performance [col. 9]; a measure that is unnecessary in view of Applicant's teachings in the present application. The "temporal discriminator" aspect of the range "gating" element of this invention is described at page 6 at lines 13-21 of the specification and is neither taught nor suggested by Contarino or Scheps '616. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter.

The Office Action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Under applicable due process regulations, Applicant is entitled to at least one opportunity to rebut a properly-substantiated argument (*prima facie* case) for obviousness compliant with M.P.E.P. §706.02 responsive to a non-final action. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejections of claims

Response to the rejections of claim 4 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

“After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claim 4 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Scheps ‘616 in further view of Schneiter. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action in that there is no citation of any suggestion in the art for combining the teachings of Contarino, Scheps ‘616 and Schneiter. Examiner offers no reference nor authority that proposes combining the Contarino, Scheps ‘616 and Schneiter teachings in any manner for any purpose.

Moreover, even when combined, these teachings do not include every element of Applicant’s invention as claimed, and do not appear to lead to **any** advantageous result, which is consistent with a lack of suggestion or motivation for such combination. The above discussion of Contarino and Scheps ‘616 demonstrates that the combined references do not suggest every element of the base claim 1 from which Applicant’s claim 4 depends. The proposed combination of Contarino, Scheps ‘616 and Schneiter is missing several elements of Applicant’s claim 4. Applicant respectfully asserts that Schneiter in fact neither teaches nor suggests a lidar target imaging device but instead discloses video camera system. Moreover, although Schneiter mentions an **encoder** pulse rate that does not exceed 500 kHz, Applicant respectfully asserts that this encoder rate is completely unrelated to the claimed **pulse laser** repetition rate (an encoder operates to report the position of a moving shaft and a pulse laser operates to emit light pulses). Applicant’s claim 4 clearly specifies that the pulse laser rate of the imaging lidar is preferably greater than 600KHz. Nothing in the Schneiter reference in any way suggests the operating of an imaging lidar (or anything else) above 600 KHz; even the Schneiter encoder chip operates no higher than 500 KHz. Accordingly, the office action fails to

propose any combination of references sufficient to arrive at the claimed subject matter.

The office action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Under applicable due process regulations, Applicant is entitled to at least one opportunity to rebut a properly-substantiated argument (*prima facie* case) for obviousness compliant with M.P.E.P. §706.02 responsive to a non-final action. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejections of claim 4.

Response to the rejections of claims 4 under 35 U.S.C. §103(a)

Reference is made to M.P.E.P. §706.02, which states:

“After indicating that the rejection is under 35 U.S.C. §103, the examiner should set forth in the Office Action (1) the relevant teachings of the prior art relied upon, preferably with the reference to the relevant column or page number(s) and line number(s) where appropriate, (2) the difference or differences in the claim over the applied reference(s), (3) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and (4) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.”

Claim 6 is rejected under 35 U.S.C. §103(a) for obviousness over Contarino in view of Scheps ‘616 in further view of Geiger. Applicant respectfully traverses this rejection for the following reasons. The rejection is inconsistent with the applicable M.P.E.P. requirements because there is no *prima facie* case of obviousness recited in the Office Action in that there is no citation of any suggestion in the art for combining the teachings of Contarino, Scheps ‘616 and Geiger. Examiner offers no reference nor authority that proposes combining the Contarino, Scheps ‘616 and Geiger teachings in any manner for any purpose.

Moreover, even when combined, these teachings do not include every element of Applicant’s invention as claimed, and do not appear to lead to **any** advantageous result, which is consistent with a lack of suggestion or motivation for such combination. The above discussion of Contarino and Scheps ‘616 demonstrates that the combination does not anticipate all elements of the base claim 1 from which Applicant’s claim 6 depends. The proposed combination of Contarino, Scheps ‘616 and Geiger is missing several elements of Applicant’s claim 6. Applicant respectfully asserts that Geiger neither teaches nor suggests a periodically-poled crystal pulsed laser but instead describes a multi-

crystal parametric optical oscillator. In fact, periodically-poled crystal material of the type described and claimed by Applicant in the present application was not commercially-available until 1998, about eight years after the filing date of the Geiger reference, and could not have been considered by Geiger as part of his compilation of suggested commercially-available materials. Accordingly, the office action fails to propose any combination of references sufficient to arrive at the claimed subject matter.

The office action also fails to recite or particularly point out any suggestion in the prior art for making the proposed combination, thereby failing to explain why such proposed combination would have been obvious. Under applicable due process regulations, Applicant is entitled to at least one opportunity to rebut a properly-substantiated argument (*prima facie* case) for obviousness compliant with M.P.E.P. §706.02 responsive to a non-final action. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. §103(a) rejections of claim 6.

Conclusion

For the reasons set forth above, Applicant respectfully requests reexamination and reconsideration of claims 1-7. Applicant respectfully solicits allowance of claims 1-7 at an early date. The necessary 37 C.F.R. §1.17(e) fee is attached hereto.

Respectfully submitted,



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PTO Registration No. 34,041